Chapter 6 Practice Test

Multiple Choice
Identify the choice that best completes the statement or answers the question.

1. Find the values of the variables and the lengths of the sides of this kite.
   \[
   \begin{align*}
   y - 2 & \quad x + 2 \\
   2x + 2 & \quad x + 11
   \end{align*}
   \]
   
   a. \( x = 9, \ y = 13; \ 7, \ 15 \) 
   b. \( x = 13, \ y = 9; \ 7, \ 15 \) 
   c. \( x = 9, \ y = 13; \ 11, \ 20 \) 
   d. \( x = 13, \ y = 9; \ 11, \ 11 \)

2. What is the most precise name for quadrilateral \( ABCD \) with vertices \( A(-5, \ 2), \ B(-3, \ 6), \ C(6, \ 6), \) and \( D(4, \ 2) \)?
   a. quadrilateral 
   b. rectangle 
   c. parallelogram 
   d. rhombus

3. \( ABCD \) is a parallelogram. If \( m\angle DAB = 66 \), then \( m\angle BCD = \) ?
   The diagram is not to scale.
   
   a. 66 
   b. 124 
   c. 114 
   d. 132

4. \( ABCD \) is a parallelogram. If \( m\angle DAB = 115 \), then \( m\angle BCD = \) ?
   The diagram is not to scale.
   
   a. 125 
   b. 65 
   c. 75 
   d. 115

5. \( LMNO \) is a parallelogram. If \( NM = x + 15 \) and \( OL = 3x + 5 \) find the value of \( x \) and then find \( NM \) and \( OL \).
6. For the parallelogram, if \( m\angle 2 = 5x - 28 \) and \( m\angle 4 = 3x - 10 \), find \( m\angle 3 \). The diagram is not to scale.

7. Find the values of the variables in the parallelogram. The diagram is not to scale.

8. In the parallelogram, \( m\angle KLO = 68 \) and \( m\angle MLO = 61 \). Find \( m\angle KJM \). The diagram is not to scale.

9. In parallelogram \( DEFG \), \( DH = x + 3 \), \( HF = 3y \), \( GH = 4x - 5 \), and \( HE = 2y + 3 \). Find the values of \( x \) and \( y \). The diagram is not to scale.
10. Find \( AM \) in the parallelogram if \( PN = 9 \) and \( AO = 4 \). The diagram is not to scale.

\[ a. \ x = 6, \ y = 3 \quad b. \ x = 2, \ y = 3 \quad c. \ x = 3, \ y = 2 \quad d. \ x = 3, \ y = 6 \]

11. Find values of \( x \) and \( y \) for which \( ABCD \) must be a parallelogram. The diagram is not to scale.

\[ a. \ x = 10, \ y = 38 \quad b. \ x = 10, \ y = 21 \quad c. \ x = 10, \ y = 7 \quad d. \ x = 7, \ y = 10 \]

12. Based on the information in the diagram, can you prove that the figure is a parallelogram? Explain.
a. Yes; opposite sides are congruent.
b. Yes; opposite angles are congruent.
c. No; you cannot prove that the quadrilateral is a parallelogram.
d. Yes; two opposite sides are both parallel and congruent.

13. Based on the information given, can you determine that the quadrilateral must be a parallelogram? Explain.

Given: $XY \cong WZ$ and $XW \cong YZ$

- a. No; you cannot determine that the quadrilateral is a parallelogram.
- b. Yes; two opposite sides are both parallel and congruent.
- c. Yes; opposite sides are congruent.
- d. Yes; diagonals of a parallelogram bisect each other.

14. If $ON = 5x - 4, LM = 4x + 7, NM = x - 7$, and $OL = 2y - 6$, find the values of $x$ and $y$ for which $LMNO$ must be a parallelogram. The diagram is not to scale.

- a. $x = 4, y = 5$
- b. $x = 4, y = \frac{1}{5}$
- c. $x = 11, y = \frac{1}{5}$
- d. $x = 11, y = 5$

15. If $m\angle B = m\angle D = 41$, find $m\angle C$ so that quadrilateral $ABCD$ is a parallelogram. The diagram is not to scale.
16. In the rhombus, $m\angle 1 = 6x$, $m\angle 2 = x + y$, and $m\angle 3 = 18z$. Find the value of each variable. The diagram is not to scale.

- a. $x = 15$, $y = 165$, $z = 10$
- b. $x = 30$, $y = 75$, $z = 10$
- c. $x = 15$, $y = 75$, $z = 5$
- d. $x = 30$, $y = 165$, $z = 5$

17. $DEFG$ is a rectangle. $DF = 5x - 5$ and $EG = x + 11$. Find the value of $x$ and the length of each diagonal.

- a. $x = 4$, $DF = 13$, $EG = 13$
- b. $x = 4$, $DF = 15$, $EG = 15$
- c. $x = 4$, $DF = 15$, $EG = 18$
- d. $x = 2$, $DF = 13$, $EG = 13$

18. Find the values of $a$ and $b$. The diagram is not to scale.

- a. $a = 144$, $b = 67$
- b. $a = 144$, $b = 36$
- c. $a = 113$, $b = 67$
- d. $a = 113$, $b = 36$

19. Find $m\angle 1$ and $m\angle 3$ in the kite. The diagram is not to scale.
20. \( \angle J \) and \( \angle M \) are base angles of isosceles trapezoid JKLM. If \( m\angle J = 20x + 9 \), and \( m\angle M = 14x + 15 \), find \( m\angle K \).

- a. 151
- b. 1
- c. 29
- d. 75.5

21. For the parallelogram, find coordinates for \( P \) without using any new variables.

- a. \((a - c, c)\)
- b. \((c, a)\)
- c. \((a + c, b)\)
- d. \((c, b)\)

22. In the coordinate plane, three vertices of rectangle HIJK are \( H(0, 0) \), \( I(0, d) \), and \( K(e, 0) \). What are the coordinates of point \( J \)?

- a. \((2e, 2d)\)
- b. \((d, e)\)
- c. \((e, d)\)
- d. \(\left(\frac{d}{2}, \frac{e}{2}\right)\)

23. Which diagram shows the most useful positioning of a square in the first quadrant of a coordinate plane?

- a.
- b.
- c.
24. Which diagram shows the most useful positioning and accurate labeling of a kite in the coordinate plane?

a.

b. 

d. 

25. The vertices of the trapezoid are the origin along with $A(4m, 4n)$, $B(4q, 4n)$, and $C(4p, 0)$. Find the midpoint of the midsegment of the trapezoid.

a. $(2q, 2n)$

b. $(m + q + p, 2n)$

c. $(m + q + p, n)$

d. $(2m + 2p, 2n)$

Short Answer

26. Find the values of the variables and the lengths of the sides of this rectangle. The diagram is not to scale.
27. What type of quadrilateral has exactly one pair of parallel sides?

28. Isosceles trapezoid $ABCD$ has legs $\overline{AB}$ and $\overline{CD}$, and base $\overline{BC}$. If $AB = 4y - 3$, $BC = 3y - 4$, and $CD = 5y - 10$, find the value of $y$.

29. For parallelogram $PQRS$, find the values of $x$ and $y$. Then find $PT$, $TR$, $ST$, and $TQ$. The diagram is not to scale.

30. Complete this statement: For parallelogram $ABCD$, $\overline{BO} \cong \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_$. Then state a definition or theorem that justifies your answer.

31. Give the name that best describes the parallelogram and find the measures of the numbered angles. The diagram is not to scale.
32. Find the lengths of the diagonals of this trapezoid.

33. Judging by appearance, classify the figure in as many ways as possible using rectangle, trapezoid, square, quadrilateral, parallelogram, rhombus.

Essay

34. Verify that quadrilateral $ABCD$ with vertices $A(-5, -1), B(-9, 6), C(-1, 5),$ and $D(3, -2)$ is a rhombus by showing that it is a parallelogram with perpendicular diagonals.
Other

35. Is the quadrilateral a parallelogram? Explain. The diagram is not to scale.

36. Can this quadrilateral be a parallelogram? Explain.

37. Can this quadrilateral be a parallelogram? Explain.
MULTIPLE CHOICE

1. ANS: C  REF: 6-1 Classifying Quadrilaterals  TOP: 6-1 Example 3
2. ANS: C  REF: 6-1 Classifying Quadrilaterals  TOP: 6-1 Example 2
3. ANS: C  REF: 6-2 Properties of Parallelograms  TOP: 6-2 Example 1
4. ANS: D  REF: 6-2 Properties of Parallelograms
5. ANS: B  REF: 6-2 Properties of Parallelograms  TOP: 6-2 Example 2
6. ANS: D  REF: 6-2 Properties of Parallelograms  TOP: 6-2 Example 2
7. ANS: D  REF: 6-2 Properties of Parallelograms
8. ANS: C  REF: 6-2 Properties of Parallelograms
10. ANS: B  REF: 6-2 Properties of Parallelograms
11. ANS: C  REF: 6-3 Proving That a Quadrilateral is a Parallelogram  TOP: 6-3 Example 1
12. ANS: B  REF: 6-3 Proving That a Quadrilateral is a Parallelogram  TOP: 6-3 Example 2
13. ANS: C  REF: 6-3 Proving That a Quadrilateral is a Parallelogram  TOP: 6-3 Example 2
14. ANS: D  REF: 6-3 Proving That a Quadrilateral is a Parallelogram
15. ANS: B  REF: 6-3 Proving That a Quadrilateral is a Parallelogram
16. ANS: C  REF: 6-4 Special Parallelograms  TOP: 6-4 Example 1
17. ANS: C  REF: 6-4 Special Parallelograms  TOP: 6-4 Example 2
18. ANS: A  REF: 6-5 Trapezoids and Kites  TOP: 6-5 Example 1
19. ANS: C  REF: 6-5 Trapezoids and Kites  TOP: 6-5 Example 3
20. ANS: A  REF: 6-5 Trapezoids and Kites
21. ANS: C  REF: 6-6 Placing Figures in the Coordinate Plane  TOP: 6-6 Example 2
22. ANS: C  
REF: 6-6 Placing Figures in the Coordinate Plane  
TOP: 6-6 Example 2

23. ANS: C  
REF: 6-6 Placing Figures in the Coordinate Plane

24. ANS: D  
REF: 6-6 Placing Figures in the Coordinate Plane

25. ANS: B  
REF: 6-7 Proofs Using Coordinate Geometry

**SHORT ANSWER**

26. ANS:
\[ x = 7, \quad y = 4; \quad 20, \quad 35 \]

REF: 6-1 Classifying Quadrilaterals  
TOP: 6-1 Example 3

27. ANS: trapezoid

REF: 6-1 Classifying Quadrilaterals

28. ANS: 7

REF: 6-1 Classifying Quadrilaterals

29. ANS:
\[ x = 3, \quad y = 6; \quad 5, \quad 5, \quad 7, \quad 7 \]

REF: 6-2 Properties of Parallelograms  
TOP: 6-2 Example 3

30. ANS:
\[ OD; \quad \text{the diagonals of a parallelogram bisect each other.} \]

REF: 6-2 Properties of Parallelograms

31. ANS: Rhombus; the measure of all numbered angles equal 31.

REF: 6-4 Special Parallelograms

32. ANS:
Each diagonal has length \( \sqrt{(a+b)^2 + c^2} \).

REF: 6-6 Placing Figures in the Coordinate Plane

33. ANS: parallelogram, quadrilateral
ESSAY

34. ANS:

[4] Shows $ABCD$ is a parallelogram (by any of several methods); then shows diagonals are perpendicular by computing slopes to be $\frac{3}{2}$ and $-\frac{2}{3}$. Includes meaningful commentary on what is occurring.

[3] Shows $ABCD$ is a parallelogram and shows diagonals are perpendicular, but presentation is not clear.


[1] Work incomplete, but shows some understanding of what to do.

OTHER

35. ANS:

Yes. $\angle C$ is supplementary to both $\angle A$ and $\angle D$ since $41 + 139 = 180$. So $\overline{AB} \parallel \overline{CD}$ and $\overline{CA} \parallel \overline{DB}$ and $ABCD$ is a parallelogram.

REF: 6-3 Proving That a Quadrilateral is a Parallelogram

36. ANS:

Yes; the quadrilateral could be a parallelogram. Tick marks are used to show congruent segments. Different tick marks do not mean different lengths. If the quadrilateral were a parallelogram, the two sides with different tick marks would be congruent.

REF: 6-4 Special Parallelograms

37. ANS:

Yes; the quadrilateral could be a parallelogram. If the quadrilateral were a parallelogram, the four marked angles would all be congruent and the quadrilateral would be a rhombus.

REF: 6-4 Special Parallelograms